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no. 62



UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

FOREST STATISTICS

FOR

OKANOGAN COUNTY, WASHINGTON

From the Inventory Phase of the Forest Survey.

By

Philip A. Briegleb



CALIFORNIA FOREST EXPERIMENT STATION
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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PACIFIC NORTHWEST FOREST EXPERIMENT STATION



ADDRESS REPLY TO
DIRECTOR
AND REFER TO

R-NW

Forest Survey
County Statistics

424 U. S. COURT HOUSE,
MAIN AND SIXTH STREETS,
PORTLAND, OREGON

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CALIFORNIA FOREST
EXPERIMENT STATION

March 29, 1937

Director,
California Forest Experiment Station,
331 Giannini Hall,
Berkeley, California

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Dear Mr. Kotok:

A copy of "Forest Statistics for Okanogan County, Washington", the twelfth of a series of Forest Survey mimeographed reports for eastern Washington and eastern Oregon, is enclosed for your files. The explanatory text, "The Forest Survey of Eastern Oregon and Eastern Washington", which accompanied the first report, should be referred to for detailed type descriptions and methods of survey procedure.

Previously forest statistics have been released for all counties in western Oregon and western Washington; for Klamath, Wasco, Jefferson, Harney, Lake, and Deschutes Counties in eastern Oregon, and for Yakima, Klickitat, Chelan, Kittitas, and Walla Walla, Columbia, Garfield, and Asotin Counties in eastern Washington. Additional copies of these reports are available for distribution.

Very truly yours,

THORNTON T. MUNGER, Director

By

R. W. Cowlin
Acting

Enclosure

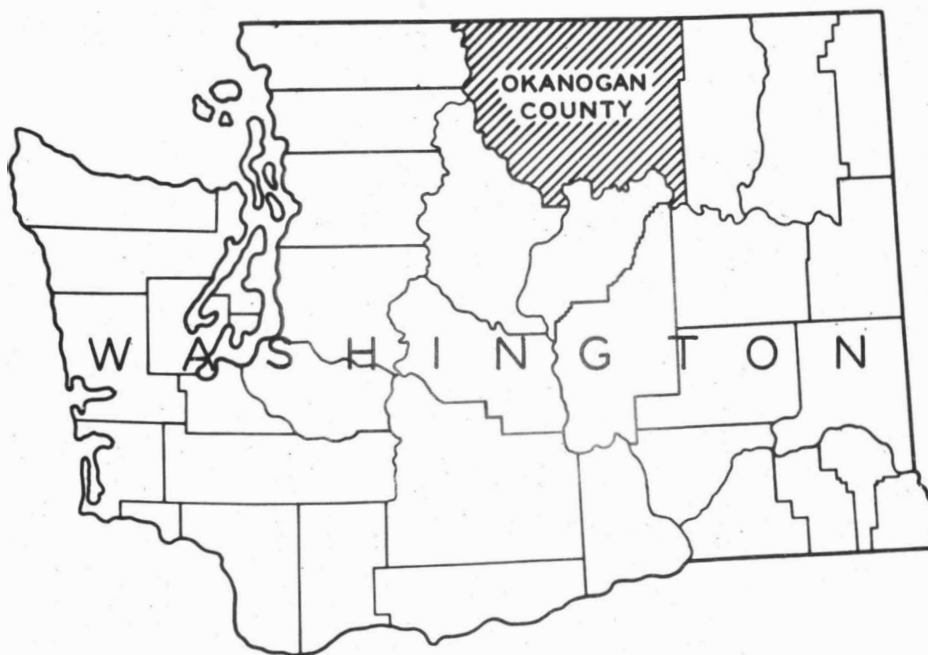
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330 GIANNINI HALL, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON

FROM THE INVENTORY PHASE OF THE FOREST SURVEY

Forest survey report no 623



U. S. DEPARTMENT OF AGRICULTURE FOREST SERVICE
PACIFIC NORTHWEST FOREST EXPERIMENT STATION
THORNTON T. MUNGER, DIRECTOR

H. J. ANDREWS, IN CHARGE OF FOREST SURVEY R. W. COWLIN, ASSISTANT

PHILIP A. BRIEGLEB, IN CHARGE OF FIELD AND OFFICE WORK
IN OKANOGAN COUNTY

PORTLAND, OREGON

MARCH 25, 1937

CALIFORNIA FOREST & RANGE EXPERIMENT STATION

230 EIA-MARCH 1 1937

FIGURE 1

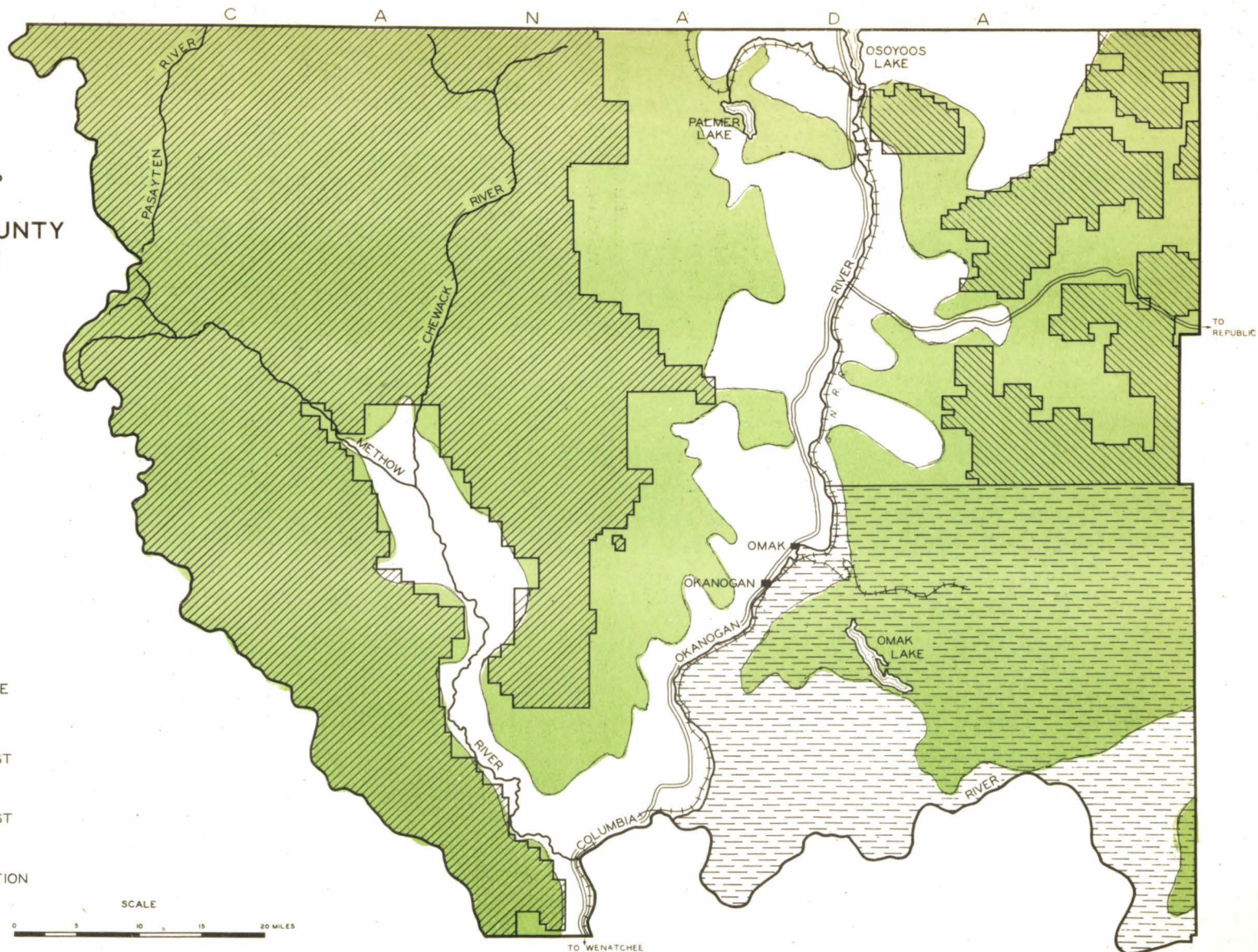
OUTLINE MAP
OF
OKANOGAN COUNTY
WASHINGTON

1937



LEGEND

-  FOREST ZONE
-  NONFOREST ZONE
-  CHELAN NATIONAL FOREST
-  COLVILLE NATIONAL FOREST
-  COLVILLE INDIAN RESERVATION



FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON

By Philip A. Briegleb^{1/}

Okanogan County, largest in the State of Washington, consists predominantly of forest land. Its mountain ranges rise from dry, treeless valleys to treeless, alpine summits, but slopes between these extremes support extensive and varied forest stands. Useful as a source of raw material for wood products, as a protector of slopes that contribute to the water supply for the irrigated districts, and as a recreational asset, the forests comprise one of the county's most valuable natural resources. The accessible stands yield the raw material for its most important manufacturing industry - sawmilling, and Omak, the largest town, is important principally as a sawmill center.

This report summarizes results of the inventory phase of the forest survey of the county made by the Forest Service during 1935 as a part of a national survey of forest resources.^{2/} "The Forest Survey of Eastern Oregon and Eastern Washington", an explanatory text containing detailed definitions of the forest types recognized and a description of the methods used in the inventory, should be read in connection with this report.

^{1/} THE FIELD AND OFFICE WORK OF THE FOREST SURVEY OF OKANOGAN COUNTY WAS DONE BY PHILIP A. BRIEGLEB, W. H. BOLLES, E. D. BUELL, P. N. PRATT, W. V. S. LITCHFIELD, W. E. SANKELA, W. E. PELTO, H. M. WOLFE, A. W. HODGMAN, G. H. JACKSON, GEO. FROST, L. E. TUCKER, R. H. EDDY, L. W. HUNTINGTON, R. W. COX, FENTON HARLESS, M. J. LAURIDSEN, C. S. SMITH, C. DE WOLFE, C. E. BROWN, AND B. P. BENNETT.

^{2/} OREGON AND WASHINGTON WERE DIVIDED FOR PURPOSES OF THE SURVEY INTO TWO REGIONS, (1) THE DOUGLAS FIR REGION, CONSISTING OF THAT PART OF BOTH STATES WEST OF THE SUMMIT OF THE CASCADE RANGE, AND (2) EASTERN OREGON AND EASTERN WASHINGTON, THAT PART OF BOTH STATES EAST OF THE SUMMIT OF THE CASCADE RANGE. EACH REGION WAS DIVIDED INTO FOREST SURVEY UNITS COMPOSED OF ONE OR MORE COUNTIES. AT A LATER DATE A REPORT WILL BE ISSUED FOR EACH SURVEY UNIT PRESENTING A TEXTUAL DESCRIPTION OF THE UNIT, DETAILED INVENTORY SUMMARIES, AND STATISTICS OF GROWTH AND DEPLETION ANALYZED IN THE LIGHT OF THE INVENTORY. A REGIONAL REPORT WILL ALSO BE ISSUED WHICH WILL PRESENT AND DISCUSS FINDINGS FOR THE REGION AS A WHOLE. THE REGIONAL REPORT WILL INCLUDE AN INTERPRETATION OF THE FOREST SURVEY DATA AS RELATED TO OTHER ECONOMIC DATA AND A COMPREHENSIVE ANALYSIS OF THE REGIONAL FOREST SITUATION FROM BOTH A PHYSICAL AND AN ECONOMIC STANDPOINT.

Location and Description of County

Located in north-central Washington, Okanogan County extends from the Canadian line south some 65 miles to the Columbia River. From its western boundary, formed by the summit of the Cascade Range and the Methow River-Lake Chelan divide, this county extends eastward 60 to 90 miles. It has a total land area of 3,341,440 acres.

Most of the county is mountainous, and the western part occupied by the Cascade Range, is extremely rugged. Considerable of the terrain is above timber line and consists of rocks, mountain meadows, and glaciers. The spurs and ridges in the high Cascade Range, particularly their northern slopes, have been deeply carved by glaciers into steep-walled cirques and U-shaped valleys. Southern slopes, although generally more regular, frequently are precipitous and avalanche-scarred. Even within the altitudinal range of commercial timber much of the county is too steep and rocky to support forests of commercial value. Many brush-covered, gentler slopes would doubtless support timber stands except for avalanches of snow and rock precipitated upon them from the crags above.

In eastern Okanogan County the less abrupt Colville Mountains, part of the Rocky Mountain system, rise to rounded summits. Occasional benches and moderate slopes occur here and along principal streams elsewhere in the county, but areas of gentle topography are small and broken by buttes, ridges, escarpments, and coulees. Elevations range from approximately 700 feet along the Columbia River to 8,970 feet on the summit of North Gardner Mountain in the Cascade Range. Mount Bonaparte, the highest peak of the Colville Mountains, reaches an elevation of 7,280 feet.

The entire county is drained by the Columbia River and its tributaries whose prevailing direction of drainage is southerly. The principal rivers in this county are the Okanogan and the Methow, the former rising in British Columbia and the latter in the county's northwestern corner. The extreme northwestern part of the county is drained by the north-flowing Pasayten and Ashnola, and the northeastern corner by tributaries of the Kettle River. These three streams flow through the Province of British Columbia before their waters empty into the Columbia River in the United States. Omak, Osoyoos, and Palmer, the three largest lakes in the county, are located in the low country. Omak and a number of lesser lakes in the lowlands are somewhat alkaline in character. Small alpine lakes occur in the mountains.

Ranges in elevation and relation to the Cascade Divide contribute to a considerable variety of climatic conditions. The immediate nonforested valleys of the Columbia, Okanogan, and lower Methow Rivers are relatively dry. Annual precipitation at Omak has averaged but 10.4 inches over the past 27 years. At Conconully near the edge of the forest zone the average annual precipitation for the past 36 years has been 14.5 inches. Precipitation is unquestionably heavier at higher elevations. It is believed to average 15 to 30 inches annually over the Colville Mountains and from 15 to more than 60 inches annually in the Cascade Range, depending upon the loca-

tion. Temperature varies widely with locality and season. Summer temperatures well over 100°F. are common in the inhabited valleys as are subzero temperatures in winter. The growing season here extends, on the average, from early May to early October. Temperatures are much lower in the mountains where killing frosts occur during every month of the year. Snowfall is heavy in the mountains, particularly in the Cascade Range, where the first falls are experienced in September and October and snow covers much of the ground until early summer. Here the combination of heavy snowfall and steep slopes results in many avalanches.

Principal transportation facilities of the county are shown in figure 1. A branch line of the Great Northern Railroad, following the Columbia and Okanogan Rivers, crosses the central part of the county. The county's main highway, the Cariboo Trail, parallels the railroad. From this artery a high standard highway extends through the Colville Mountains to Republic, another up the Methow Valley to Winthrop. An improved highway over the mountain from Okanogan to Twisp provides direct connection between the population centers of the Okanogan and the Methow Valleys. Forest and county roads penetrate to many other parts. In the northwest portion of the county an area of several hundred thousand acres is entirely roadless. Much of this expanse of subalpine and alpine country is a part of the vast North Cascade Primitive Area which embraces some of the most rugged and inaccessible terrain in the United States exclusive of Alaska. A few horse and foot trails provide the only routes of ground travel through this wilderness, and the Forest Service has here resorted to air transportation of both men and equipment to expedite fire control in the rugged back country. This development has been facilitated by the construction of a landing field in the heart of the Pasayten River wilderness.

Okanogan is one of the most sparsely inhabited counties in the State. The population in 1930, according to the Bureau of the Census, was 18,519, or approximately 3.5 persons per square mile. Slightly more than half of the inhabitants live on farms. Omak, the largest town, had a population of 2,547 in 1930; inhabitants of Okanogan, second largest town and county seat, numbered 1,519. The only other settlement of more than 500 population is Oroville which in 1930 had 800 persons.

The Nonforest Land

Nonforest land occupies 1,106,000 acres or about one-third of the total area of the county (tables 2 and 3). Its generalized distribution is shown in figure 1. Most of the nonforest land consists of grazing country along the principal streams and on low ridges and benches. Approximately 173,000 acres^{3/} or only 15 percent is agricultural crop land or plowable pasture. About 112,000 acres of the nonforest land consists principally of scattered areas of mountain meadows, grass-covered slopes, barren rocks and glaciers in the national forests.

^{3/} ACCORDING TO THE U. S. CENSUS OF AGRICULTURE OF 1935.

The Forests

Two-thirds of Okanogan County, or 2,235,000 acres consists of forest land. The location of this resource is shown in generalized fashion by figure 1.^{4/}

Ponderosa pine lands occupy a belt of less than one mile to ordinarily not more than 10 miles wide bordering the open land of the principal valleys. An exception occurs in the northern sixth of the county where the open land of the Okanogan Valley is bordered on the east principally by forests of western larch and Douglas fir, and on the west principally by rocky noncommercial areas. Ponderosa pine types in the form of narrow strips extend far into the Cascade Range along the Chewack, Methow, and Twisp Rivers. The largest remaining blocks of virgin ponderosa pine stands occur in the southeastern part of the Colville Indian Reservation, in the Aeneas and Bonaparte Valleys to the north, along the southern extremity of the divide between the Okanogan and Methow Rivers, north of the confluence of the Methow and Chewack Rivers and on the Twisp River and tributaries. The most extensive areas of cutover pine land are found east of Omak on the Colville Indian Reservation. The largest block of cutover pine land has an area in excess of 30,000 acres.

In the Colville Mountains the forest land above the ponderosa pine sites is covered chiefly by stands of western larch and Douglas fir. Some of the high slopes are covered by stands of lodgepole pine which on the highest summits give way to subalpine forests. In the Cascade Range the large majority of the forest land above the ponderosa pine zone is occupied by lodgepole pine stands, noncommercial rocky type, and subalpine forest. These are prevailing forest types over the vast wilderness in the northwestern part of the county. In this rugged region timber types containing trees of commercial size consist principally of Engelmann spruce or Douglas fir with considerable western larch east of the Methow River. They are frequently confined by precipitous canyon walls to narrow strips along streams. Topography permitting, these types occasionally attain a width of two or three miles. The most extensive body of Engelmann spruce timber in the county is located in the northwestern corner on the Pasayten River and is topographically tributary to British Columbia.

Sawlog Types

Coniferous stands of saw-timber size (exclusive of lodgepole pine) cover more than half of the forest land, or approximately 1,220,000 acres. Occupying two-thirds of this area, or 802,000 acres, are ponderosa pine sawlog stands. Pure ponderosa pine stands of sawlog size (type 20.5)

^{4/} LOCATION AND EXTENT OF FOREST TYPES ARE SHOWN BY FOREST SURVEY TYPE MAPS. INFORMATION REGARDING 1-INCH-TO-THE-MILE COUNTY TYPE MAPS AND $\frac{1}{4}$ -INCH-TO-THE-MILE LITHOGRAPHED STATE TYPE MAPS AND HOW THEY MAY BE OBTAINED WILL BE FURNISHED UPON REQUEST. ADDRESS DIRECTOR, PACIFIC NORTHWEST FOREST EXPERIMENT STATION, 423 U. S. COURT HOUSE, PORTLAND, OREGON.

occupy in total 318,000 acres. Occurring mostly between 2,000 and 5,000 feet elevation, this type is relatively accessible, and is the source of most of the sawlogs produced in the county. Although it is the most extensive forest type in the county, it occupies but one-third of the area of ponderosa pine sites and less than one-seventh of the total area of forest land. Less than one-eighth of the pure ponderosa pine stands of sawlog size are included in the private ownership class; slightly less than one-half are in national-forest ownership, slightly more than one-fourth are in the Indian ownership class, and nearly one-eighth are State-owned.

Stands of sawlog size containing 50 to 80 percent of ponderosa pine (type 20) cover 154,000 acres. This type as a whole is accessible and includes some high-quality timber. Pine mixture forests containing 20 to 50 percent of ponderosa pine (type 27) cover 90,000 acres. These stands, occurring on the moister sites, vary greatly in volume, quality, and composition. In general they are less valuable than those of types 20.5 and 20.

More than one-fifth of the ponderosa pine stands of sawlog size consist of scattered woodlands of low quality and volume (type 5 $\frac{1}{2}$) on unfavorable sites.

Immature ponderosa pine stands of sawlog size, generally from 12 to 22 inches in d.b.h. (type 21), cover about 62,000 acres. Approximately three-fourths of this area has been logged but supports a residual volume in excess of 1 M board feet per acre. The remainder is covered by even-aged stands that have followed burns. About 16 percent of this type is classified as well stocked with reproduction, 46 percent medium stocked, and 38 percent poorly stocked.^{5/}

Most extensive of the sawlog types other than ponderosa pine is the upper-slope mixture, type 27 $\frac{1}{2}$, with an area of 273,000 acres. Stands of this type occur on moist sites along streams and on cool slopes, mostly between 4,000 and 6,000 feet in elevation. Although the type varies greatly in composition Engelmann spruce is the commonest component species in the western part of the county; western larch is most frequent in the eastern part. The type is largely publicly owned; 71 percent is national forest and only 10 percent is in the private ownership class. Because this type usually occurs in remote locations and is composed principally of timber species for which there is little commercial demand, it is at present generally economically unavailable.

^{5/} REPRODUCTION INCLUDES ALL TREES LESS THAN 12 INCHES D.B.H., I.E., POLES, SAPLINGS AND SEEDLINGS. CLASSIFICATION IN TERMS OF NORMAL STOCKING IS AS FOLLOWS: WELL STOCKED, 70 TO 100 PERCENT; MEDIUM STOCKED, 40 TO 69 PERCENT; POORLY STOCKED, 10 TO 39 PERCENT; NONSTOCKED, LESS THAN 10 PERCENT.

Old-growth forests of Douglas fir (type 7) cover 116,000 acres. This type, like the preceding one, is seldom exploited at present due to its relatively low-quality timber and remote location. Less than 6 percent of the area occupied by type 7 is in the private ownership class and nearly 80 percent is national forest.

Ponderosa Pine Reproduction

This group, including types 22 and 28 (table 3), has an area of 111,000 acres. About five-sixths of this area consists of 50 percent or more of ponderosa pine (type 22); the remainder is composed of 20 to 50 percent ponderosa pine (type 28). Of the group as a whole 11 percent is well stocked, 53 percent is medium stocked, and 36 percent is poorly stocked. Approximately 83 percent of ponderosa pine reproduction areas occur on cutover land, the remainder on old burns. Nearly half of the area occupied by these types is in the private ownership class; most of the remainder is in the Indian ownership class. These types, if protected, will in time provide sawlog supplies of ponderosa pine, the species upon which the lumber industry of the county is dependent.

Coniferous Reproduction Other Than Pine

The types in this group, 9B, 10, 24, and 28 $\frac{1}{2}$, cover in the aggregate 115,000 acres. Although they exceed the area of ponderosa pine reproduction, these types have less present economic importance, and on the average they are less accessible. At present they are serving the useful functions of watershed protection and scenic enhancement.

Noncommercial Types

One of the striking characteristics of the forests in Okanogan County is the relatively large area of noncommercial types. Subalpine forests (type 33), noncommercial rocky areas (type 38), and the lodgepole pine forests (types 25, 26, and 26A) together occupy 759,000 acres or more than one-third of the total forest land. Some of the lodgepole pine stands contain Douglas fir, Engelmann spruce, and balsam firs in mixture, and east of the Methow River western larch also is a component species. Occurring most frequently as an understory these species are, in some stands, slowly replacing lodgepole pine by ecological succession. If protected from fire such stands may in time attain commercial characteristics.

These types, although practically valueless for the production of commercial timber, nevertheless add much to the scenic, recreational, and watershed resources of the county and in addition some yield minor forest products such as fuel wood and fruit tree props for local use. They occur principally on the national forests, and nearly one-third of the area of these types is in the North Cascade Primitive Area.

Deforested Types

Nonstocked forest lands total approximately 28,000 acres, or 1.2 percent of the total forest-land area. About 93 percent of the nonstocked forest lands have been deforested by fire alone and are classified as type 37; only 7 percent of the nonstocked forest lands have been cut over at any time (type 35). The deforested types embrace principally commercial forest sites, less than 2 percent being on lands incapable of producing commercial timber stands. Approximately two-thirds of the nonstocked forest lands occur on the Chelan National Forest, principally in remote locations.

Productive Capacity of Forest Land

A classification of the forest land according to its capacity to produce timber crops is shown in table 4. Excepting the lodgepole pine sites, noncommercial rocky areas, and subalpine and hardwood sites, all the forest land was rated on the basis of its capacity to produce either ponderosa pine or Douglas fir. In total 1,468,000 acres were so classified, 932,000 acres according to the ponderosa pine classification and 536,000 acres according to that for Douglas fir. Ponderosa pine lands average little better than site quality class V. This is somewhat poorer than the median site quality for the pine lands of eastern Washington and eastern Oregon. Douglas fir lands average approximately site quality class V, the poorest recognized in the site classification for this species.

Saw-Timber Volume

Okanogan County contains a total saw-timber volume of 9,143,000 M board feet. The distribution of this volume by species and by ownership class is shown in table 1 and in figure 2. Ponderosa pine, the most valuable species, is also the most abundant, composing 45 percent of the total volume. More than one-quarter of the total volume is Douglas fir, approximately one-eighth is western larch, and one-ninth is Engelmann spruce.

Lands of the Chelan and Colville National Forests carry slightly less than two-thirds of the total saw-timber volume in the county. They have more than one-half of the ponderosa pine, more than two-thirds of the Douglas fir, more than one-half of the western larch, and almost all of the Engelmann spruce. Approximately one-tenth of the total saw-timber volume is on national-forest land reserved from cutting, most of which is in the North Cascade Primitive area. Nearly one-seventh of the saw-timber volume is in the Indian ownership class, one-tenth is owned by the State of Washington, and only about one-twelfth is in the private ownership class.

Economic Development

White occupancy of this territory is believed to have begun with the establishment of Fort Okanogan in 1811 near the mouth of the Okanogan River. In common with other early northwestern settlements the first economic development here was based upon the fur trade. Later in the nineteenth

century, with the influx of immigrants, mining and stock raising became the principal economic activities. In 1888, when Okanogan County was created by division of Stevens County, Ruby, a mining settlement in lower Salmon Creek Canyon, reputedly of several thousand inhabitants, was selected as the seat of government; Ruby is now merely a memory. Later the county offices were moved to Conconully. Anticipating the coming of the railroad the county seat was again moved, after considerable contest from other river communities, to its present location in the town of Okanogan.

Inauguration of rail service in the Okanogan Valley (in 1914) enabled agriculture and industry to attain their present development in the county. Previous to this time transportation of bulky commodities to market was available only by slow and intermittent river boats.

Agriculture is now by far the most important economic pursuit and during 1930 directly employed nearly one-half of all gainful workers in the county.^{6/} Approximately one-eighth of those gainfully employed were in forestry and the forest industries. Extraction of minerals, of prime importance during the latter part of the nineteenth century, employed only slightly more than one percent of the gainful workers in 1930.

Stock raising, though still an important agricultural pursuit, is now overshadowed by fruit growing and other forms of intensive crop production which have been fostered by expansion of irrigation farming. According to the Bureau of the Census the total value of farm products derived from Okanogan County during 1929 was \$5,714,000. Irrigated areas, embracing about 36,000 acres or only 5 percent of the total land in farms, were productive of approximately two-thirds of the total value of farm products. However, the high productivity of this relatively small, intensively cultivated area is directly dependent upon waters coming from vast, forested slopes. The apple crop is the most valuable single source of income. Other fruits, vegetables, dairy products, sheep, cattle and small grains are listed among the important agricultural products. In 1935 there were 53,000 sheep and nearly 51,000 cattle in Okanogan County. Most of the sheepmen in the county are dependent upon forage from the surrounding forest lands for their flocks during the summer months, and in addition the forest lands of this county supply summer range for flocks that winter in the low country of other central and eastern Washington counties. The forest ranges of the county also provide summer and fall forage for many cattle.

Extensive forest lands comprise the principal recreational resource of the county. Even though undeveloped, the recreational assets are already important and annually attract many hunters, fishermen, and campers.

^{6/} ACCORDING TO THE FIFTEENTH CENSUS OF THE UNITED STATES.

Before the advent of the railroad, lumber produced in Okanogan County was limited virtually to that required for local use. Subsequently, however, the sawmill capacity and lumber production have been increased and a large part of the lumber cut at present is for markets outside the county. In 1935 the county contained 23 sawmills with an aggregate 8-hour capacity of 432 M board feet. The largest mill, located at Omak, has a capacity of 150 M board feet per 8 hours, or 35 percent of the total installed sawmill capacity in the county. The capacity of the remaining mills averages but 13 M board feet, and only one has a capacity as great as 75 M board feet. Other than Omak, the principal communities contributing to the lumber output of the county are Okanogan, Tonasket, Oroville, Brewster, and Twisp.

During the decade that ended with 1935 the annual lumber production in Okanogan County averaged about 61 million board feet. This is about one-eighth of the average annual production in all eastern Washington during this period. Approximately 93 percent of the lumber output was ponderosa pine, the remainder being principally Douglas fir. Lumber, box shock, and specialty commodities are the principal products. It is estimated that about 25,000 M board feet or 41 percent of the lumber cut annually is manufactured into box shock, and approximately two-thirds of the shock produced is required to box the county's own annual apple crop. A relatively large proportion of the output from the large mill in Omak consists of specialty products. As a result, the value of products per M board feet of lumber cut in this mill averages about twice that of other mills in the county. Practically all of the lumber is sawed from logs cut within the county and relatively few logs cut here are milled elsewhere.

Logging operations, typical of the ponderosa pine region, are managed by sawmill operators or conducted by contract loggers to supply specific mills; there is no central log market. The largest logging concern maintains a railroad for the transportation of logs from woods to mill, but the output of all other logging operations is hauled from the woods by motor truck.

Sawlog stands, on the average, contain a relatively low merchantable volume per acre. Much of the topography is unfavorable to logging, and the average timber growth capacity of the forest sites is comparatively low. Cut-over lands, although moderately stocked with reproduction, have been left with little or no reserve volume to form a nucleus for succeeding cuts. Timber mortality, due chiefly to drought and insects, has been heavy in many areas during the past two decades. Nevertheless several factors of the forest situation in Okanogan County are favorable for sustained forest production.

Although the most accessible timber in the county has been cut, there is still a considerable supply of economically available stumpage. Lands in national forest and in the Indian ownership class embrace approximately three-fourths of the ponderosa pine saw timber and an equal proportion of the ponderosa pine sites. Thus a major portion of the operable

forest resource of the county is owned by agencies that have adopted the objective of sustaining forest production. Increased local market for sawmill products, particularly for lumber and structural timbers, has been stimulated by the recent development of the Columbia River Grand Coulee project at the county's southern edge. Considerable competition may be expected, in fact already exists, for some of the publicly-owned timber, and the allotment of national forest and Indian Reservation stumpage to specific mills involves numerous problems in forest policy and administration. The forest land of the county has the capacity to sustain saw-log production equal to or exceeding the average annual lumber cut in the county during the recent past. However, unless present cutting practice is adjusted to more fully provide for succeeding cuts by leaving cut-over lands with greater reserve volume in thrifty trees, a decided curtailment of cut will be necessary in the future in order to build back depleted growing stocks. Lighter and more frequent cutting concentrated in the overmature element of the saw-timber stands could do much toward insuring the forest industries of Okanogan County a sustained supply of raw material.

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON
FROM INVENTORY PHASE OF FOREST SURVEY

TABLE 1. VOLUME OF TIMBER BY SPECIES AND OWNERSHIP CLASS
DATA CORRECTED TO JANUARY 1, 1936

TREES 12" AND MORE IN D.B.H.
THOUSANDS OF BOARD FEET, LOG SCALE, SCRIBNER RULE

SUR- VEY SYM- BOL :	SPECIES ^{1/}	STATE,				INDIAN,				FEDERAL		TOTAL
		PRIVATE	AVAILABLE	COUNTY	MUNICIPAL	TRIBAL AND	PUBLIC	AVAILABLE	RESERVED			
		FOR	CUTTING			TRUST	DOMAIN	FOR	FROM			
						ALLOTMENT		CUTTING	CUTTING			
Y :	PONDEROSA PINE	387,525	531,203	29,125	24	927,690	80,634	2,200,090	347			4,156,638
W :	WESTERN WHITE PINE							3,233	2,097			5,330
LP :	LOGSPOLE PINE	366	2,622			545	21	35,668	64,653			103,875
DF :	DOUGLAS FIR	215,790	242,988	18,078		267,215	47,686	1,648,162	93,088			2,533,007
C :	WESTERN RED CEDAR	137						2,071				2,208
MH :	MOUNTAIN HEMLOCK							3,447				3,447
WF :	LOWLAND WHITE FIR	13				112		903				1,028
A :	SILVER FIR							19,552	4,209			23,761
AF :	ALPINE FIR	20	43			54	5	70,671	100,901			171,694
WL :	WESTERN LARCH	161,161	144,892	14,850		150,133	33,885	622,091	3,907			1,130,919
ES :	ENGELMANN SPRUCE	2,219	23,167	188		1,359	173	345,728	630,382			1,003,216
BC ^{2/} :	NORTHERN BLACK COTTONWOOD	3,978	165				20	3,866	45			8,074
	TOTAL	771,209	945,080	62,241	24	1,347,108	162,424	4,955,482	899,629			9,143,197

^{1/} SPECIES NOT LISTED HERE WHICH OCCUR IN THE COUNTY, BUT IN NEGLIGIBLE QUANTITIES, ARE WESTERN HEMLOCK, WHITEBARK PINE, ALPINE LARCH, WESTERN WHITE SPRUCE, ALASKA CEDAR, BIRCH, AND ALDER.

^{2/} ADDITIONAL VOLUMES THAT WERE DETERMINED IN CORDS (A) NORTHERN BLACK COTTONWOOD 5,800 CORDS (B) ASPEN 12,000 CORDS.

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON
FROM INVENTORY PHASE OF FOREST SURVEY

TABLE 2. AREA, IN ACRES, OF ALL FOREST COVER TYPES, BY OWNERSHIP CLASS
DATA CORRECTED TO JANUARY 1, 1936

SUR- VEY TYPE NO.	TYPE DEFINITION	PRIVATE	STATE,	COUNTY	MUNICIPAL	INDIAN,	PUBLIC	FEDERAL			TOTAL
			AVAILABLE			TRIBAL AND		NATIONAL FOREST	RESERVED		
			FOR			TRUST				DOMAIN	
			CUTTING			ALLOTMENT		CUTTING	CUTTING		
	WOODLAND:										
5½	PONDEROSA PINE WOODLAND: SCATTERED STANDS OF MATURE PONDEROSA PINE ON UNFAVORABLE SITES	66,850	13,765	3,635	25	43,660	16,290	33,905		178,130	
	PONDEROSA PINE: FORESTS CONTAINING 50% OR MORE OF PONDEROSA PINE										
20	PONDEROSA PINE, LARGE: FORESTS CONTAINING 50 TO 80% OF PONDEROSA PINE, MORE THAN 22" DBH	15,980	16,765	1,565		28,865	5,430	84,965	75	153,645	
20.5	PURE PONDEROSA PINE, LARGE: FORESTS CONTAINING 80% OR MORE OF PONDEROSA PINE, MORE THAN 22" DBH	37,460	40,715	1,900		87,545	4,760	145,980		318,360	
21	PONDEROSA PINE, SMALL: 12 TO 22" DBH	17,920	4,215	1,520		31,760	750	5,390		61,555	
22	PONDEROSA PINE SEEDLINGS, SAPLINGS, AND POLES: LESS THAN 12" DBH	50,180	4,960	4,155	30	23,715	3,435	6,250		92,725	
	PINE MIXTURE: MIXED FORESTS CONTAINING 20 TO 50% OF PONDEROSA PINE										
27	PINE MIXTURE, LARGE: 12" OR MORE DBH	10,625	7,065	1,250		16,490	2,070	52,360	190	90,050	
28	PINE MIXTURE, SMALL: LESS THAN 12" DBH	3,620	70	185		8,970	2,295	3,560		18,700	
	DOUGLAS FIR: FORESTS CONTAINING 60% OR MORE OF DOUGLAS FIR										
7	DOUGLAS FIR, SMALL OLD GROWTH: 22 TO 40" DBH	6,410	12,955	890		2,110	2,190	85,030	6,235	115,820	
8	DOUGLAS FIR, LARGE SECOND GROWTH: 22 TO 40" DBH	75	10			2,980	130	5,210	380	8,785	
9A	DOUGLAS FIR, LARGE POLES: 12 TO 20" DBH	2,355	510	50		55	410	15,275	80	18,735	
9B	DOUGLAS FIR, SMALL POLES: 6 TO 10" DBH	1,475	210	15		690	760	11,995		15,145	
10	DOUGLAS FIR, SEEDLINGS AND SAPLINGS: LESS THAN 6" DBH	1,875	85	160		575	160	2,460		5,315	
	FIR-MOUNTAIN HEMLOCK: FORESTS CONTAINING 50% OR MORE OF SILVER FIR, ALPINE FIR, MOUNTAIN HEMLOCK, OR WESTERN HEMLOCK, OR OF ANY COMBINATION OF THESE SPECIES										
23	FIR-MOUNTAIN HEMLOCK, LARGE: 12" OR MORE DBH							1,185	60	1,245	
24	FIR-MOUNTAIN HEMLOCK, SMALL: LESS THAN 12" DBH							1,935	290	2,225	
	UPPER-SLOPE MIXTURE: MIXED FORESTS OF WESTERN LARCH, DOUGLAS FIR, ENGELMANN SPRUCE, SILVER FIR, WHITE FIR, ALPINE FIR, LODGEPOLE PINE, OR WHITE PINE; OCCASIONALLY OTHER SPECIES										
27½	UPPER-SLOPE MIXTURE, LARGE: 12" OR MORE DBH	27,655	23,595	2,195		19,970	5,510	131,315	63,045	273,185	
29½	UPPER-SLOPE MIXTURE, SMALL: LESS THAN 12" DBH	4,875	4,780	215		23,935	1,015	40,995	16,215	92,030	
	LODGEPOLE PINE: FORESTS CONTAINING 50% OR MORE OF LODGEPOLE PINE										
25	LODGEPOLE PINE, LARGE: 12" OR MORE DBH		55					1,085	3,475	4,615	
26	LODGEPOLE PINE, MEDIUM: 6 TO 10" DBH	1,185	33,945			1,885	225	118,700	19,925	175,865	
26A	LODGEPOLE PINE, SMALL: LESS THAN 6" DBH	690	8,090			2,770		52,195	37,465	101,210	
	HARDWOOD: FORESTS CONTAINING 50% OR MORE OF NORTHERN BLACK COTTONWOOD AND ASPEN										
31.5	HARDWOODS, LARGE: 12" OR MORE DBH	1,060	40					155		1,255	
31	HARDWOODS, SMALL: LESS THAN 12" DBH	1,150	10			130	10	470		1,770	
33	SUBALPINE: FORESTS AT UPPER LIMITS OF TREE GROWTH, USUALLY UNMERCHANTABLE	385	3,475			845	515	138,205	121,165	264,590	
	NONSTOCKED CUTOVERS: LOGGED AREAS NOT SATISFACTORILY RESTOCKED AND NOT CARRYING A RESIDUAL STAND OF 1 M OR MORE PER ACRE										
35A	CUT SINCE BEGINNING OF 1920	1,015	130	635		40				1,820	
35B	CUT BEFORE 1920		65	5				165		235	
	DEFORESTED AREAS: NONRESTOCKED AREAS DEFORESTED OTHERWISE THAN BY CUTTING										
37	DEFORESTED BURNS	2,225	2,450	500		115	1,895	13,405	4,945	25,535	
38	NONCOMMERCIAL ROCKY AREAS	16,985	23,100	1,150		19,755	18,875	91,630	41,415	212,910	
	TOTALS FOR FOREST LAND	272,050	201,060	20,025	55	316,760	66,725	1,043,820	314,960	2,235,455	
1 & 2	NONFOREST LAND: CULTIVATED, GRASS, SAGEBRUSH, BARRENS, CITIES, UNMEASURED WATER SURFACES, ETC.										
	TOTALS FOR COUNTY							1,112,160	369,080	1,481,240	

1/ THE TOTAL AREA OF THE COUNTY, ACCORDING TO THE BUREAU OF THE CENSUS, IS 3,341,440 ACRES. OF THIS TOTAL, 2,357,915 ACRES WAS CLASSIFIED AS TO OWNERSHIP BY THE FOREST SURVEY.

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON
FROM INVENTORY PHASE OF FOREST SURVEY

TABLE 3. AREA, IN ACRES, OF GENERALIZED FOREST TYPES, BY OWNERSHIP CLASS
DATA CORRECTED TO JANUARY 1, 1936

TYPE DEFINITION	FEDERAL									TOTAL
	PRIVATE	STATE,	COUNTY	MUNICIPAL	INDIAN,	PUBLIC	NATIONAL FOREST			
		AVAILABLE			TRUST		AVAILABLE	RESERVED		
		FOR			ALLOTMENT		FOR	FROM		
	CUTTING			CUTTING						
HARDWOODS: COTTONWOOD AND ASPEN										
SURVEY TYPES 31 AND 31.5	2,210	50			130	10	625			3,025
PONDEROSA PINE 12" OR MORE DBH										
SURVEY TYPES 5½, 20, 20.5, 21, AND 27	148,835	82,525	9,870	25	208,320	29,300	322,600	265		801,740
PONDEROSA PINE LESS THAN 12" DBH	ON CUTOVER AREAS	47,180	4,725	4,045	30	28,725	4,140	3,285		92,130
SURVEY TYPES 22 AND 28	ON OLD BURNS	6,620	305	295		3,960	1,590	6,525		19,295
	TOTAL	53,800	5,030	4,340	30	32,685	5,730	9,810		111,425
CONIFERS 12" OR MORE DBH OTHER THAN PONDEROSA PINE										
AND LODGEPOLE PINE										
SURVEY TYPES 7, 8, 9A, 23, AND 27½	36,495	37,070	3,135		25,015	8,240	238,015	69,800		417,770
CONIFERS LESS THAN 12" DBH OTHER THAN PONDEROSA	ON CUTOVER AREAS	3,065	715	325		1,505	220	1,240		7,070
PINE AND LODGEPOLE PINE	ON OLD BURNS	5,160	4,360	65		23,695	1,715	56,145	16,505	107,645
SURVEY TYPES 9B, 10, 24, AND 28½	TOTAL	8,225	5,075	390		25,200	1,935	57,385	16,505	114,715
LODGEPOLE PINE 12" OR MORE DBH										
SURVEY TYPE 25		55					1,085	3,475		4,615
LODGEPOLE PINE LESS THAN 12" DBH										
SURVEY TYPES 26 AND 26A	1,875	42,035			4,655	225	170,895	57,390		277,075
NONCOMMERCIAL AREAS										
SURVEY TYPES 33 AND 38	17,370	26,575	1,150		20,600	19,390	229,835	162,580		477,500
NONRESTOCKED CUTOVER AREAS AND DEFORESTED BURNS										
SURVEY TYPES 35A, 35B, AND 37	3,240	2,645	1,140		155	1,895	13,570	4,945		27,590
TOTALS FOR FOREST LAND	272,050	201,060	20,025	55	316,760	66,725	1,043,820	314,960		2,235,455
NONFOREST LAND										
SURVEY TYPES 1 AND 2	983,525 ACRES OF NONFOREST LAND UNCLASSIFIED BY OWNERSHIP							68,340	54,120	1,105,985
TOTALS FOR COUNTY							1,112,160	369,080	✓	3,341,440

1/ THE TOTAL AREA OF THE COUNTY, ACCORDING TO THE BUREAU OF THE CENSUS, IS 3,341,440 ACRES. OF THIS TOTAL, 2,357,915 ACRES WAS CLASSIFIED AS TO OWNERSHIP BY THE FOREST SURVEY.

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON
FROM INVENTORY PHASE OF FOREST SURVEY

TABLE 4. AREA OF FOREST LAND BY SITE QUALITY
DATA CORRECTED TO JANUARY 1, 1936

TYPE	SITE QUALITY CLASS ^{1/}	ACRES	AREA		
			PERCENTAGE OF--		
			CONIFEROUS :	TOTAL :	TOTAL
			FOREST LAND :	FOREST	AREA OF
			AS TO SITE :	LAND ^{2/}	COUNTY
			QUALITY :		
PONDEROSA PINE AND PONDEROSA PINE MIXTURE	PONDEROSA PINE	III :	4,280 :	0.3 :	0.1
		IV :	256,100 :	17.4 :	7.7
		V :	613,625 :	41.8 :	18.4
		VI :	58,150 :	4.0 :	1.7
			932,155 :	63.5 :	27.9
DOUGLAS FIR, FIR- MOUNTAIN HEMLOCK, AND UPPER-SLOPE MIXTURE	DOUGLAS FIR	III :	1,880 :	5.3 :	2.3
		IV :	75,700 :		
		V :	458,555 :	31.2 :	13.7
			536,135 :	36.5 :	16.0
			1,468,290 :	100.0 :	43.9
TOTAL					
LODGEPOLE PINE ^{3/}			284,790 :	12.8 :	8.5
NONCOMMERCIAL ROCKY AREAS			212,910 :	9.5 :	6.4
SUBALPINE ^{4/}			266,440 :	11.9 :	8.0
HARDWOOD			3,025 :	0.1 :	0.1
TOTAL			767,165 :	34.3 :	23.0
GRAND TOTAL			2,235,455 :	100.0 :	66.9

- ^{1/} THE "SITE QUALITY" OF A FOREST AREA IS ITS RELATIVE PRODUCTIVE CAPACITY, DETERMINED BY CLIMATIC, SOIL, TOPOGRAPHIC, AND OTHER FACTORS. THE INDEX OF SITE QUALITY IS THE AVERAGE HEIGHT OF THE DOMINANT STAND AT THE AGE OF 100 YEARS. SIX SITE QUALITY CLASSES ARE RECOGNIZED FOR PONDEROSA PINE AND FIVE FOR DOUGLAS FIR, CLASS I BEING IN EACH CASE THE HIGHEST. IN THE SURVEY THE PONDEROSA PINE AND DOUGLAS FIR CLASSIFICATIONS, RESPECTIVELY, WERE USED NOT ONLY FOR TYPES OF WHICH THESE SPECIES ARE CHARACTERISTIC COMPONENTS BUT FOR OTHER TYPES FOR WHICH NO SITE QUALITY CLASSIFICATIONS HAVE BEEN DEVELOPED.
- ^{2/} THE TOTAL AREA OF THE COUNTY, ACCORDING TO THE BUREAU OF THE CENSUS, IS 3,341,440 ACRES. OF THIS TOTAL, ACCORDING TO FOREST SURVEY DATA, 2,235,455 ACRES (66.9 PERCENT) IS FOREST LAND AND 1,105,985 ACRES (33.1 PERCENT) IS NONFOREST LAND.
- ^{3/} INCLUDES 3,100 ACRES OF DEFORESTED BURN.
- ^{4/} INCLUDES 1,850 ACRES OF DEFORESTED BURN.

FOREST STATISTICS FOR OKANOGAN COUNTY, WASHINGTON

FROM INVENTORY PHASE OF FOREST SURVEY

FIGURE 2. DISTRIBUTION OF SAW-TIMBER VOLUME BY SPECIES AND OWNERSHIP CLASS (FROM TABLE 1)

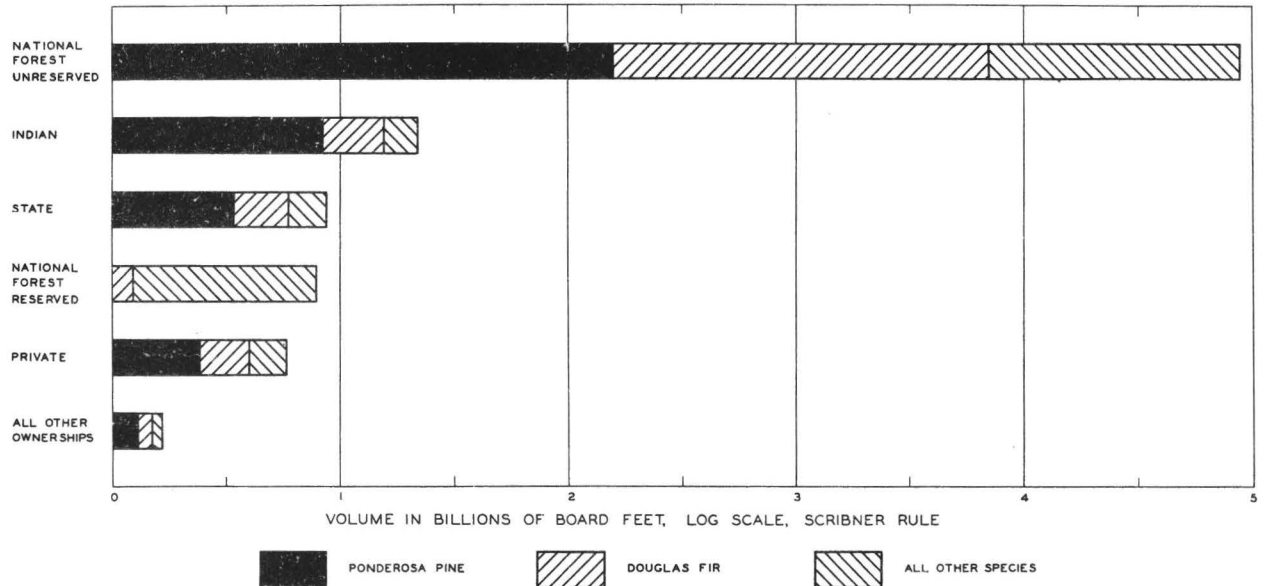


FIGURE 3. OWNERSHIP OF FOREST LAND (FROM TABLE 2)

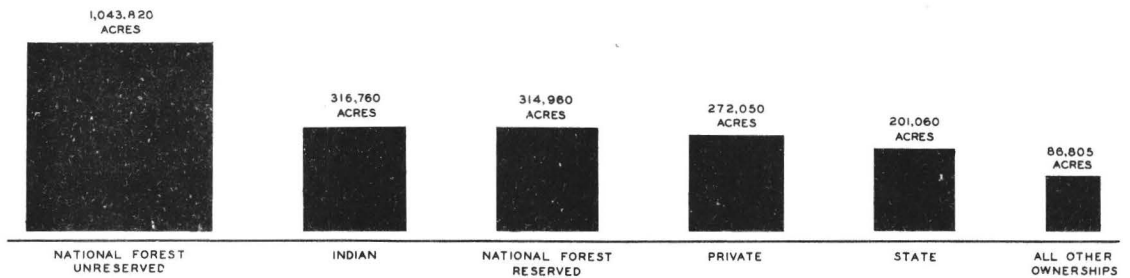


FIGURE 4. DISTRIBUTION OF FOREST LAND BY GENERALIZED TYPES, ALL OWNERSHIP CLASSES (FROM TABLE 3)

